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CLAIMS

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3 What is claimed is:

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1 1. An optical switch comprising:

2 a) an input fiber collimator for receiving a light
3 beam;

4 b) a first mirror optically connected to the input
5 collimator, for receiving the light beam from the
6 input collimator;

7 c) a first galvanometer coupled to the first mirror,
8 for rotating the first mirror around a first axis so
9 as to position the first mirror alternatively to any
10 one of a plurality of first mirror positions;

11 d) a second mirror optically connected to the first
12 mirror, for receiving the light beam from the first
13 mirror;

14 e) a second galvanometer coupled to the second mirror,
15 for rotating the second mirror about a second axis
16 perpendicular to the first axis, so as to position
17 the second mirror alternatively to any one of a
18 plurality of second mirror positions; and

19 f) a two-dimensional array of output fiber collimators
20 each optically coupled to the second mirror, each of
21 the output collimators being aligned with a ray
22 corresponding to one of the first mirror positions
23 and one of the second mirror positions, whereby the
24 light beam is directed to any one of the output
25 collimators by rotating the first mirror and the
26 second mirror.

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1 2. The switch of claim 1 wherein the array of output
2 collimators is arranged over an output surface having a
3 substantially spherical curvature of a radius valued

between R and $R+d$, wherein R is a distance between the second mirror and the output surface, and d is a distance between the first axis and the second axis.

3. The switch of claim 1 wherein the array of output collimators is arranged over an output surface defined substantially by an exact constant optical path condition accounting for a dependence of the optical path between the input collimator and each of the output collimators on an orientation of the first mirror and an orientation of the second mirror.

4. The switch of claim 3 wherein the exact constant optical path condition is

$$z = \sqrt{[(\sqrt{(R+d)^2 - x^2} - d)^2 - y^2]}$$

wherein R is a real image radius, and d is a virtual image radius substantially equal to a distance between the first axis and the second axis.

An optical switch comprising:

- a) an optical input for receiving a light beam;
- b) a galvanometer-driven, rotatable-mirror x-y scanner optically coupled to the optical input, for directing the light beam to one of a plurality of directions; and
- c) an array of output fiber collimators arranged over a concave output surface, each of the output collimators being aligned with one of the directions so as to receive the light beam when directed by the x-y scanner.

The optical switch of claim 5 wherein the output surface has a substantially spherical curvature.

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1 7. The optical switch of claim 5 wherein the output
2 surface is defined substantially by a constant optical
3 path condition accounting for a dependence of an
4 optical path corresponding to each direction on an
5 orientation of the x-y scanner.

1 8. An optical switch comprising:
2 a) an optical input for receiving a light beam;
3 b) a rotatable-mirror x-y scanner optically coupled to
4 the optical input, for selectively directing the
5 light beam to one of a plurality of output paths;
6
7 c) an array of optical outputs capable of optical
8 communication with the x-y scanner and aligned over
9 an output surface, each of the optical outputs being
10 aligned with one of the output paths so as to
11 receive the light beam when directed by the x-y
12 scanner.

1 9. An optical system comprising:
2 a) an optical source for generating a light beam;
3 b) an optical switch in optical communication with the
4 optical source, for receiving and directing the
5 light beam, the optical switch comprising:
6 an optical input optically connected to the optical
7 source, for receiving the light beam,
8 a rotatable-mirror x-y scanner optically coupled to
9 the optical input, for selectively directing
10 the light beam to one of a plurality of output
11 paths, and
12 an array of optical outputs capable of optical
13 communication with the x-y scanner, each of the
14 optical outputs being aligned to one of the

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and directing the light beam to an output optical fiber coupled to the selected one of the array of output fiber collimators.

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13. An optical switching method comprising the steps of:

- a) receiving a light beam;
- b) controlling a rotatable-mirror x-y scanner to selectively direct the light beam to one of a plurality of output paths; and
- c) receiving the light beam at a selected one of an array of optical outputs aligned over a concave output surface, each of the optical outputs being aligned with one of the output paths so as to receive the light beam when directed by the x-y scanner.

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